

CLAIM AMENDMENTS

Underlining denotes added text; strike through and [[]] denote cancelled text.

1-21. (Canceled)

22. (Currently Amended) A method, comprising:

- a) providing:
 - i) a plurality of reaction vessels having a top and a bottom configured with an aspect ratio of at least 3.3, wherein said ratio is defined as vessel height divided by vessel diameter,
 - ii) a heat source contacting said bottom of said reaction vessels;
 - iii) a cooling means contacting said top of said reaction vessels; and,
 - iv) a solution comprising a plurality of reactants;
- b) introducing said solution into a first reaction vessel comprising a first temperature differential between said top and said bottom, wherein
 - i) said first temperature differential is produced by simultaneously heating said bottom with said heat source and cooling said top with said cooling means,
 - ii) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel, and
 - iii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction vessel;
- c) transferring said solution from said first reaction vessel to a second reaction vessel wherein said second reaction vessel comprises a second temperature differential between said top and said bottom; and,
- d) transferring said solution from said second reaction vessel to said first reaction vessel under such conditions that said plurality of reactants form a reactant product.

23. **(Previously Presented)** The method of Claim 22, wherein, in cross section, said reaction vessels are without corners.

24. **(Previously Presented)** The method of Claim 22, wherein, in cross section, said reaction vessels are with corners.

25. **(Original)** The method of Claim 22, wherein said reactants comprise i) nucleic acid comprising a target and ii) primers substantially homologous to at least a portion of said target.

26. **(Canceled)**

27. **(Previously Presented)** The method of Claim 22, wherein said reactant product comprise amplified nucleic acid.

28. **(Previously Presented)** The method of Claim 22, wherein said reaction vessels comprise material selected from the group consisting of Plexiglas™, glass, plastics, silicones and metal.

29. **(Original)** The method of Claim 22, wherein said reaction vessel is part of an array.

30. **(Previously Presented)** The method of Claim 22, wherein said first temperature differential of at least 10°C is established within said convection cell.

31. **(Previously Presented)** The method of Claim 22, further providing at least one microdroplet channel wherein said microdroplet channel is in fluid communication with said reaction vessels.

32. **(Currently Amended)** A method, comprising:

- a) providing:
 - i) a plurality of reaction vessels comprising a top and a bottom;
 - ii) a heat source contacting said bottom of said reaction vessels;
 - iii) an active cooling means contacting said top of said reaction vessels; and
 - iv) a solution comprising a plurality of nucleic acids comprising a target and a primer substantially homologous to at least a portion of said target;
- b) introducing said solution into a first reaction vessel comprising a first temperature differential between said top and said bottom, wherein
 - i) said first temperature differential is produced by simultaneously heating said bottom with said heat source and cooling said top with said cooling means,
 - ii) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel, and
 - iii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction vessel;
- c) transferring said solution from said first reaction vessel to a second reaction vessel wherein said second reaction vessel comprises a second temperature differential between said top and said bottom; and
- d) transferring said solution from said second reaction vessel to said first reaction vessel under such conditions that said nucleic acids form an amplified nucleic acid.

33. **(Previously Presented)** The method of Claim 32, wherein said reaction vessels comprise at least one material selected from the group consisting of Plexiglas™, glass, plastics, silicones and metal.

34. **(Previously Presented)** The method of Claim 32, wherein said reaction vessels are part of an array.

35. **(Previously Presented)** The method of Claim 32, wherein a temperature differential of at least 5°C is established between said top surface and said bottom surface.

36. **(Previously Presented)** The method of Claim 32, also providing at least one microdroplet channel wherein said microdroplet channel is in fluid communication with said reaction vessel.

37-44. **(Canceled)**

45. **(Currently Amended)** A method, comprising:

- a) providing:
 - i) a plurality of reaction vessels comprising a top and a bottom;
 - ii) a heat source contacting said bottom of said reaction ~~vessel~~
vessels, and
 - iii) a solution comprising a plurality of reactants;
- b) introducing said solution into a first reaction vessel comprising a first temperature differential between said top and said bottom, wherein
 - i) said first temperature differential is produced by simultaneously heating said bottom with said heat source and cooling said top with said cooling means,
 - ii) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel, and
 - iii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction vessel;

- c) transferring said solution from said first reaction vessel to a second reaction vessel wherein said second reaction vessel comprises a second temperature differential between said top and said bottom; and,
- d) transferring said solution from said second reaction vessel to said first reaction vessel under conditions such that said reactants form a reactant product.

46. **(Previously Presented)** The method of Claim 45, wherein said reactants comprise i) nucleic acid comprising a target and ii) primers substantially homologous to at least a portion of said target.

47. **(Previously Presented)** The method of Claim 45, wherein said reactant product comprises amplified nucleic acid.

48. **(Previously Presented)** The method of Claim 45, wherein said reaction vessels comprise material selected from the group consisting of Plexiglas™, glass, plastics, silicones and metal.

49. **(Previously Presented)** The method of Claim 45, wherein said reaction vessels are part of an array.

50. **(Previously Presented)** The method of Claim 47, wherein said second temperature differential is at least 5°C.

51. **(Previously Presented)** The method of Claim 47, wherein said first temperature differential is at least 10°C.

52. **(Previously Presented)** The method of Claim 47, further providing at least one microdroplet channel wherein said microdroplet channel is in fluid communication with said reaction vessel.

53. (New) A method, comprising:

- a) providing:
 - i) a plurality of reaction vessels having a top and a bottom configured with an aspect ratio of at least 3.3, wherein said ratio is defined as vessel height divided by vessel diameter,
 - ii) a heat source contacting said bottom of said reaction vessels,
 - iii) a cooling means contacting said top of said reaction vessels, and,
 - iv) a solution comprising a plurality of reactants,
- b) introducing said solution into a reaction vessel, and
- c) simultaneously heating said bottom with said heat source and cooling said top with said cooling means to produce a temperature differential between said top and said bottom, wherein
 - i) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel, and
 - ii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction vessel.

54. (New) A method, comprising:

- a) providing:
 - i) a plurality of reaction vessels comprising a top and a bottom,
 - ii) a heat source contacting said bottom of said reaction vessels,
 - iii) an active cooling means contacting said top of said reaction vessels, and
 - iv) a solution comprising a plurality of nucleic acids comprising a target and a primer substantially homologous to at least a portion of said target;
- b) introducing said solution into a reaction vessel;

- c) simultaneously heating said bottom with said heat source and cooling said top with said cooling means to produce a temperature differential between said top and said bottom, wherein
 - i) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel,
 - ii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction, and
 - iii) said target nucleic acid is amplified.

55. (New) A method, comprising:

- a) providing:
 - i) a plurality of reaction vessels comprising a top and a bottom,
 - ii) a heat source contacting said bottom of said reaction vessels, and
 - iii) a solution comprising a plurality of reactants,
- b) introducing said solution into a reaction vessel,
- c) simultaneously heating said bottom with said heat source and cooling said top with said cooling means to produce a temperature differential between said top and said bottom, wherein
 - i) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel,
 - ii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction vessel, and
 - iii) said reactants form a reactant product.

56. (New) The method of Claim 22, wherein said first reaction vessel is selected from the group consisting of circular vessel and oval vessel.

57. **(New)** The method of Claim 32, wherein said first reaction vessel is selected from the group consisting of circular vessel and oval vessel.
58. **(New)** The method of Claim 45, wherein said first reaction vessel is selected from the group consisting of circular vessel and oval vessel.
59. **(New)** The method of Claim 53, wherein said reaction vessel is selected from the group consisting of circular vessel and oval vessel.
60. **(New)** The method of Claim 54, wherein said reaction vessel is selected from the group consisting of circular vessel and oval vessel.
61. **(New)** The method of Claim 55, wherein said reaction vessel is selected from the group consisting of circular vessel and oval vessel.